

# Tariff Development II: Developing a Rate Design

NARUC Energy Regulatory Partnership Program

The Public Services Regulatory Commission of Armenia  
and The Iowa Utilities Board



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# Overview

- Goals of Rate Design
- Determining Customer Classes
- Allocating Costs to Classes
- Basic Design of Rates
- Special Rate Design Topics



# Goals of Rate Design

- Cost-Based
- Stable and Predictable
- Easily Applied
- Understandable to Customers
- Acceptable to Customers



# Goals of Rate Design

- Cost-Based
  - Costs are allocated to customer classes (Residential, Commercial, Industrial) based on their characteristics:
    - Number of Customers
    - Maximum demand on the system
    - Total energy usage
  - In order to:
    - Avoid undue price discrimination among customers
    - Create price signals that encourage efficient use of system capacity, leading to lower long-run costs



# Goals of Rate Design

- Stable and Predictable
  - Produce stable revenues for the utility
  - Provide stable price signals to customers, allowing them to reliably predict their bills
  - Changed gradually (i.e., to avoid "rate shock")
- Easily Applied
  - Based on usage characteristics easily measured by most customers
    - Easily Measured: Monthly energy usage
    - Not as Easily Measured: Usage during each hour of each day ("Real-Time" pricing)



# Goals of Rate Design

- Understandable to Customers
  - Easy to Understand: Rates based on monthly energy usage
  - More Complex: Rates based on monthly usage AND daily or hourly maximum demand
- Acceptable to Customers
  - Generally Accepted: Rates based on monthly energy usage
  - Not as Generally Accepted: Residential rates based on time of usage ("Time-of-Day" pricing)



# Determining Customer Classes

In Iowa:

- Customer classes are primarily established on the basis of reasonably similar usage patterns
- This is because similar usage patterns reflect similar cost causing characteristics
- Classes are established through load research – typically involving statistical sampling of customer groups and the use of load research meters that record hourly demand and usage



# Allocating Costs to Classes

## A. Starts with Load Research

- Utility selects a statistical sample designed to represent each customer class (Residential, Commercial, Industrial)
- Each customer in the sample is metered on an hourly basis - for one year
- Hourly data is combined to represent each customer class
- Data is used to estimate energy usage and maximum demands for each customer class





# Allocating Costs to Classes

## B. Class Cost-of-Service Study

- Step 1 – Functionalization of Costs: Utility costs are organized according to 4 basic functional categories
  1. Generation (or Production)
  2. Transmission
  3. Distribution
  4. Customer Service



# Allocating Costs to Classes

## B. Class Cost-of-Service Study (continued)

- Step 2 – Classification of Costs: Each functional cost category is further divided into 3 cost classifications:
  1. Demand Costs – Fixed costs that are based on maximum demands placed on the system
  2. Energy Costs – Costs that vary with energy usage
  3. Customer Costs – The costs of providing basic service to a customer, independent of the customer's demand and energy usage levels



# Allocating Costs to Classes

## B. Class Cost-of-Service Study (continued)

- Step 3 – Allocation of Costs: The classified costs are allocated among customer classes based on their maximum demand and energy usage characteristics, and number of customers
  1. Demand Costs – Allocated either by class peak demands, or a combination of peak demands and energy usage
  2. Energy Costs – Allocated by class energy usage
  3. Customer Costs – Allocated by the number of customers in each class



# Basic Design of Rates

Class Cost-of-Service Study Provides the Basic Framework:

- Recovery of Customer Costs – Usually through a fixed monthly customer charge
- Recovery of Energy Related Costs – Non-fuel energy related costs might be treated differently than fuel costs
  - Non-fuel costs might be recovered through a fixed usage rate
  - Fuel costs might be recovered through a separate, monthly-adjusted usage rate



# Basic Design of Rates

- Recovery of Demand Costs – Depends on customer size
  - For larger customers, demand costs can be directly recovered through a separately-metered kW demand rate
  - For smaller customers, demand costs can be recovered through usage rates, in the form of either:
    1. Flat usage rates, or
    2. Higher usage rates for the first "block" of energy usage



# Basic Design of Rates

## Example 1 – Large Industrial Customer:

<u>Customer Charge</u>	\$50.00/Month
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### Energy Usage Rates

Non-Fuel Energy Costs	\$ 0.02/kWh
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<u>Monthly Fuel Costs</u>	<u>\$ 0.03/kWh</u>
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Total Energy Rate	\$ 0.05/kWh
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<u>Demand Rate</u>	\$ 5.00/kW
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# Basic Design of Rates

## Example 2 – Small Customer A:

<u>Customer Charge</u>	\$10.00/Month
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### Energy Usage Rates

Non-Fuel Energy & Demand Costs	\$ 0.04/kWh
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<u>Monthly Fuel Costs</u>	<u>\$ 0.03/kWh</u>
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Total Energy Rate	\$ 0.07/kWh
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# Basic Design of Rates

## Example 3 – Small Customer B:

<u>Customer Charge</u>	\$10.00/Month
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### First 100 kWh Usage (1<sup>st</sup> Block)

Non-Fuel Energy & Demand Costs	\$ 0.07/kWh
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<u>Monthly Fuel Costs</u>	<u>\$ 0.03/kWh</u>
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Total 1st Block Energy Rate	\$ 0.10/kWh
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### Usage over 100 kWh (2<sup>nd</sup> Block)

Non-Fuel Energy Costs	\$ 0.02/kWh
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<u>Monthly Fuel Costs</u>	<u>\$ 0.03/kWh</u>
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Total 2nd Block Energy Rate	\$ 0.05/kWh
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# Special Rate Design Topics

## A. Time-of-Use Rates – Significantly higher rates during peak periods and lower rates during off-peak periods

- Hourly load research data allows for differentiating allocated costs:
  - By monthly seasonal periods, and
  - By peak and off-peak hourly time periods
- Also requires a matching detailed study of the utility's production costs by time period



# Special Rate Design Topics

## A. Time-of-Use Rates (continued)

- Revenue neutral – Time-of-use rates are initially designed to produce the same class revenues as standard non-time-of-use rates
- Time-of-use rate design involves both science and art:
  - Science – Time-of-use rates are designed according to time differences in allocated costs and usage patterns
  - Art – Time-of-use rates are also designed to attract subscribers and to give customers price incentives to change their usage patterns



# Special Rate Design Topics

B. Standby Rates – For customers with their own generation that rely on the utility for back-up service when outages occur

This may involve:

- Standard rates during scheduled outages
- Incremental cost rates during forced outages
- Standby reservation charges based on:
  1. The probability of the customer's generation equipment experiencing forced outage
  2. The cost to the utility of standing ready to provide service to the customer at any time



# Questions?



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